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Abundance: a new high-yielding storage-type hybrid onion

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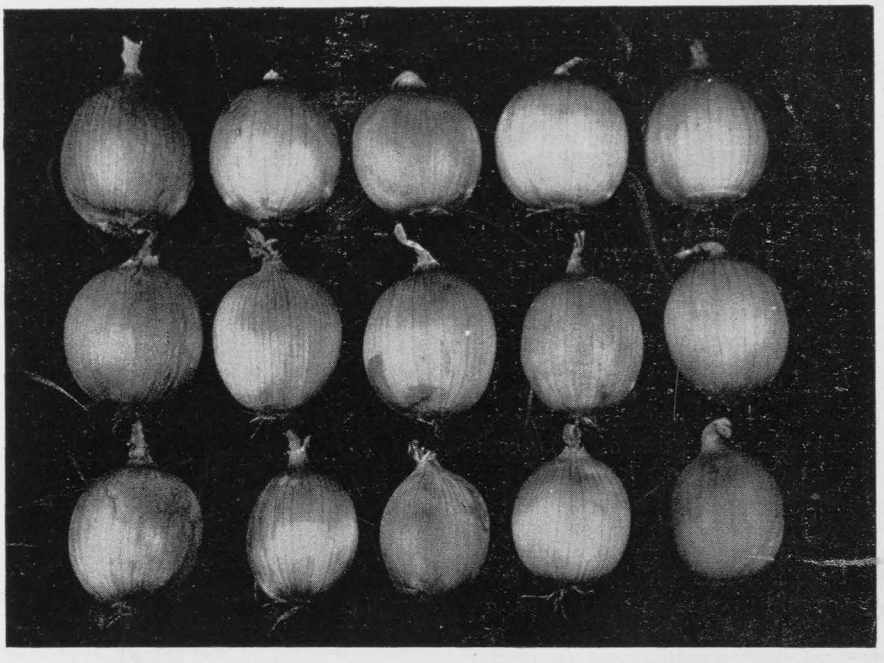
Characteristics of the F_1 Hybrid

On Dec. 1, 1953, the Iowa and Idaho agricultural experiment stations and the United States Department of Agriculture, cooperating, announced the release of the F_1 hybrid onion, Abundance, pedigree B 2108 x B 2215. This is a long-day exceptionally high-yielding storage-type hybrid. The bulb is a high globe, light yellow in color. Abundance should find acceptance as a yellow globe type for limited storage where Early Yellow Globe is adapted.

The yield data and storage performance of Abundance in comparison with those of Early Yellow Globe and Brigham Yellow Globe are given in table 1. At Clear Lake, Iowa, Abundance yielded 524 50-pound bags per acre more than Brigham Yellow Globe, or 63 percent; 96.5 percent of the bulbs of Abundance were over 2 inches in diameter, and 89.8 percent of those of Brigham Yellow Globe were over 2 inches in diameter. The onions grown at Clear Lake were stored at Ames, Iowa, in good common storage in four randomized blocks. Each sample had 25 bulbs. The onions were removed from storage and records taken on Feb. 27, 1954. The over-all loss in storage was about the same for Abundance and Brigham Yellow Globe.

At Walkerton, Ind., Abundance outyielded Early Yellow Globe by 336 50-pound bags per acre, or 40.4 percent; 92.3 percent of the bulbs of Abundance and 70.8 percent of those of Early Yellow Globe were over 2 inches in diameter. The storage sample of 100 bulbs was removed and records were taken on Dec. 1, 1953. Of the bulbs of Abundance, 2 percent were sprouted and 7 percent rotted; of the bulbs of Early Yellow Globe, 8 percent were



Abundance is a high-yielding F_1 hybrid for limited storage, adapted to areas where Early Yellow Globe is grown.

TABLE 1. Performance of Abundance in Comparison With Early Yellow Globe and Brigham Yellow Globe, Crop 1953.

LOCATION	VARIETY	Total yield of 50-lb. bags per acre	STORAGE DATA				
			Loss	Firmness rating[1]	Scale rating[2]	Root growth rating[3]	Color rating[4]
		No.	Pct.				
Clear Lake Iowa	Abundance	1,357**	6.7	3.0	3.0	3.0	3.0
	Brigham Yellow Globe	833	4.7	4.0	3.0	3.5	3.0
Walkerton, Indiana	Abundance	1,167**	25.0	.....	.....	.....	3.0
	Early Yellow Globe	831	42.0	.....	.....	.....	1.0
Elba, N.Y.	Abundance	915**	.....	.....	.....	.....	.....
	Early Yellow Globe	642	.....	.....	.....	.....	.....

[1]Firmness: 1, soft; 5, very firm; 2-4, intermediate.

[2]Scales: 1, very loose; 5, very tight; 2-4, intermediate.

[3]Root growth: 1, pronounced root growth; 5, no root growth; 2-4, intermediate root growth.

[4]Color: 1, light straw; 5, dark yellow or brown; 2-4, intermediate.

**Significantly higher yielding than check by odds greater than 99:1.

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sprouted and 18 percent rotted. The storage loss was considerably more for Early Yellow Globe than for Abundance.

At Elba, N.Y., Abundance outyielded Early Yellow Globe by 273 50-pound bags per acre, or 42.5 percent. When removed from storage on March 1, 1954, Abundance had 12 percent of the bulbs sprouted and rotted, whereas Early Yellow Globe had 33 percent. The bulbs were grown at Elba but were held in common storage at Ithaca, N.Y.

Parents of Abundance

The seed parent, B 2108, is an inbred from a shipment of Early Yellow Globe bulbs obtained in early 1940 from J. H. Snyder, Wolcott, N.Y., through A. G. Newhall, Cornell University. Both A and B lines of B 2108 have been distributed rather widely through the seed trade, but it is not known to what extent B 2108 has been increased or whether it is being used in the production of other commercial hybrids. The letter "B" preceding 2108 indicates a Beltsville inbred; the letter "A" following B 2108 indicates a male-sterile line; and the letter "B" following B 2108 indicates a companion or maintenance line. Foundation seed of the A and B lines has been increased in insect-proof cages at Beltsville, Md., Ames, Iowa, and Parma, Idaho. B 2108 has good vigor and therefore is not difficult to maintain. It sets a good crop of seed, an important characteristic in the production of single-cross hybrids.

The storage performance of B 2108 is given in table 2. The bulbs were grown at Greeley, Colo., and stored there under excellent conditions in shallow trays. The data show that the number of onions that had rotted and sprouted when removed from storage in early March was rather small. However, the bulbs became rather soft, there was considerable shedding of scales, and the development of roots at the stem plate was rather conspicuous.

Seed of B 2215, the pollen parent of Abundance, was distributed to the seed trade in January 1953. A few small lots were distributed before that time upon request. An additional amount was distributed in January 1954. B 2215 is an inbred from the same shipment of bulbs as B 2108. It is a long-day storage-type onion, high globe in shape. It has very firm flesh and yellow scales that adhere well thoughout a long storage period.

After two generations of inbreeding, B 2215 continues to yield well and produces an abundance of pollen and seed. There should be no difficulty in maintaining it. B 2215 flowers late, but it is possible to speed up flowering by manipulating storage temperatures so that flowering will occur at about the same time as that of B 2108.

At Beltsville, Md., in 1952-53, bulbs of B 2108 grown at Clear Lake, Iowa, were stored in a cool room in the headhouse of a greenhouse from mid-October to about March 1. The temperature in this room varied from 35° to 40° F. B 2215 bulbs from Clear Lake were stored under the same conditions until about the middle of January when the bulbs were placed in a cool section of the greenhouse where the night temperature was 45° to 50°; the day temperature was usually 50° to 55°, but occasionally higher. B 2108 was planted on March 10 and B 2215 on March 11. The first flowers of B 2108 were open on June 5 and the first flowers of B 2215 on June 8. When the bulbs were treated in this manner, the flowering periods of the two lines coincided very closely.

In October 1953, bulbs of B 2215 were shipped from Caldwell, Idaho, to the Plant Industry Station, Beltsville, Md., where they were held at about 45° to 50° F. until they were taken from storage on March 8, 1954. Of 632 bulbs, 5 were sprouted and 18 were rotted. The remainder of the bulbs were in excellent condition. The root primordia were quite prominent, indicating that roots would develop as soon as the bulbs were set in the field.

Breeding tests show the B 2215 is homozygous for the male-fertile gene *Ms*. B 2215 has a tendency to double, and breeding stock should be rigidly rogued for this defect. It is also rather late maturing, and, in the North in certain locations, it may not mature well, especially in the higher altitudes or during cool summers.

TABLE 2. Performance of A and B Lines of B 2108 Stored at Greeley, Colo.

Pedigree	Date removed from storage	Bulbs stored	Bulbs sprouted	Bulbs rotted	Firmness rating[1]	Scales rating[2]	Root growth rating[3]	Color rating[4]
		No.	No.	No.				
B 2108 A	March 3, 1951	448	28	10	1.5	2.5	2	1
B 2108 B	March 3, 1951	642	5	13	1.0	2.0	2	1
B 2108 A	March 1-3, 1952	1,984	33	23	1.0	1.7	2	2
B 2108 B	March 1-3, 1952	1,079	18	17	1.0	1.7	2	2
B 2108 A	March 1-4, 1953	544	7	30	1.0	2.0	2	2
B 2108 B	March 1-4, 1953	341	2	7	1.0	2.0	3	2
B 2108 A	February 23, 1954	1,295	10	1	2.0	2.0	3	2
B 2108 B	February 23, 1954	260	5	11	2.0	2.0	3	2

[1,2,3,4]See footnotes for table 1.